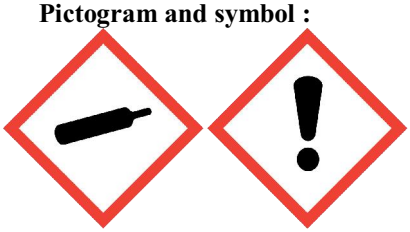
MATERIAL SAFETY DATA SHEET

1. Identification of the substance or mixture and of the supplier

A. GHS product identifier ENGENE DEGREASER
B. Recommended use of the chemical and restrictions on use
Recommended use Engin Exterior Cleaner
Restrictions on use Not available
C. Manufacturers
Company name Bullsone Co.,Ltd
Address 890-12 Dabong Tower, Darchi-dong, Gangnam-gu, Seoul, Korea
Emergency phone number 02-2106-7777
Respondent Han Dong Jin
Fax 02-2106-7911

2. Hazards identification

A. GHS classification of the substance/mixture
Flammable liquids : Category 4
Gases under pressure : Liquefied gas
Acute toxicity (oral) : Category 5
Acute toxicity (dermal) : Category 4
Skin sensitization : Category 1
Specific target organ toxicity (single exposure) : Category 3 (narcotic effects)
Hazardous to the aquatic environment (acute hazard) : Category 3
Hazardous to the aquatic environment (chronic) : Category 3
B. GHS label elements, including precautionary statements
Pictogram and symbol :



Signal word : Warning
Hazard statements :
H227 Combustible liquid
H280 Contains gas under pressure; may explode if heated.
H303 May be harmful if swallowed.
H312 Harmful in contact with skin.
H317 May cause an allergic skin reaction.
H336 May cause drowsiness or dizziness.
H402 Harmful to aquatic life.
H412 Harmful to aquatic life with long lasting effects.
Precautionary statements
Precaution
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Treatment
P302+P352 If on skin: Wash with plenty of soap and water.

P304+P340 If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312 Call a poison center or doctor/physician if you feel unwell.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P363 Wash contaminated clothing before reuse.

Storage

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P410+P403 Protect from sunlight. Store in a well-ventilated place.

Disposal

P501 Dispose the contents/container in accordance with local/regional/national/international regulations.

C. Other hazard information not included in hazard classification (NFPA)

Health 2
Flammability 1
Reactivity Not available

3. Composition/information on ingredients

Chemical Name	Common Name(Synonyms)	CAS number	EC number	Content (%)
Dipropylene glycol methyl ether	Dipropylene glycol monomethyl ether (2-Methoxymethylethoxy)propanol 2-(2-Methoxypropoxy)propan-1-ol	34590-94-8	252-104-2	> 5 %
Surfactant mixture	Polyoxyethylene alkyl aryl ether(CAS No. 9016-45-9) +Polyoxyethylene Sorbitan monooleate(CAS No. 9005-65-6) +Polyoxyethylene alkyl ether phosphate(CAS No. 51811-79-1)			> 5 %
Kerosine	Diethylene glycol hexyl ether Diethylene glycol monohexyl ether Diethylene glycol mono(n-hexyl) ether 3,6-Dioxadodecanol-1 n-Hexoxyethoxyethanol	112-59-4	203-988-3	< 75 %
Propane	Dimethylmethan	74-98-6	200-827-9	< 15 %

4. First aid measures

A. Eye contact

- Call emergency medical service.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

B. Skin contact

- If skin irritation or rash occurs: Get medical advice/attention.
- Wash contaminated clothing before reuse.
- Call emergency medical service.
- Remove and isolate contaminated clothing and shoes.

- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Wash skin with soap and water.

C. Inhalation

- If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.

D. Ingestion

- Call emergency medical service.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

E. Indication of immediate medical attention and notes for physician

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. Fire fighting measures

A. Suitable (and unsuitable) extinguishing media

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.

B. Specific hazards arising from the chemical

- Contains gas under pressure; may explode if heated.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Some of these materials, if spilled, may leave a flammable residue after evaporation

C. Special protective equipment and precautions for fire-fighters

- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Substance may be transported in a molten form.
- Ruptured cylinders may rocket.
- Some may be transported hot.
- Dike fire-control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.
- Fire involving Tanks; Do not direct water at source of leak or safety devices; icing may occur.
- Fire involving Tanks; Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks; Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks; Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Fire involving Tanks; Always stay away from tanks engulfed in fire.
- Fire involving Tanks; For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- Damaged cylinders should be handled only by specialists.
- Use extinguishing agent suitable for type of surrounding fire.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- The very fine particles may cause a fire or explosion, eliminate all ignition sources.

- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- All equipment used when handling the product must be grounded.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- A vapor suppressing foam may be used to reduce vapors.
- Cover with plastic sheet to prevent spreading.
- Prevent dust cloud.
- Please note that there are materials and conditions to avoid.

B. Environmental precautions and protective procedures

- Avoid release to the environment.
- Prevent entry into waterways, sewers, basements or confined areas.

C. The methods of purification and removal

- Dike and collect water used to fight fire.
- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb the liquid and scrub the area with detergent and water.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- Use clean non-sparking tools to collect absorbed material.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
- Powder Spill; Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- Small Spill; Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

7. Handling and storage

A. Precautions for safe handling

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Use only outdoors or in a well-ventilated area.
- Contaminated work clothing should not be allowed out of the workplace.
- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Use carefully in handling/storage.
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- Please note that there are materials and conditions to avoid.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to high temperature.

B. Conditions for safe storage

- Store in a well-ventilated place. Keep container tightly closed.
- Protect from sunlight. Store in a well-ventilated place.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
- Containers can build up pressure if exposed to heat (fire).

8. Exposure controls/personal protection

A. Occupational Exposure limits

Korea regulation

Dipropylene glycol methyl ether TWA = 100 ppm (600 mg/m³) , STEL = 150 ppm (900 mg/m³)

ACGIH regulation

Dipropylene glycol methyl ether TWA 100 ppm STEL 150 ppm

Biological exposure index

Dipropylene glycol methyl ether

OSHA regulation

Dipropylene glycol methyl ether TWA= 100 ppm, STEL= 150 ppm

Propane TWA=1000 ppm (1800 mg/m³)

NIOSH regulation

Dipropylene glycol methyl ether TWA= 100 ppm, STEL= 150 ppm

Propane TWA=1000 ppm (1800 mg/m³)

EU regulation : Not available

Other

Propane Finland:TWA=800 ppm(1500 mg/m³) Germany:TWA=1000 ppm(1800 mg/m³)

Greece:TWA=1000 ppm(1800 mg/m³) Hong Kong:TWA-2500 ppm(4508 mg/m³)

B. Appropriate engineering controls

C. Personal protective equipment

Respiratory protection

- Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.
- In case exposed to gaseous/liquid material, the respiratory protective equipments as follow are recommended. escape full facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or escape half facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or direct full facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) half facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or powered air-purifying gas mask.
- In lack of oxygen(< 19.5%), wear the supplied-air respirator or self-contained breathing apparatus.oxygen

Eye protection

- Wear enclosed safety goggles to protect from gaseous state organic material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

Body protection

- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. Physical and chemical properties

A. Appearance

Description Liquid

Color White Liquid

B. Odor Solvents

C. Odor threshold Not available

D. pH Not available

E. Melting point/freezing point Not available

F. Initial boiling point and boiling range Not available

G. Flash point Not available

H. Evaporation rate Not available

I. Flammability (solid, gas) Not applicable

J. Upper/lower flammability or explosive limits Not available

K. Vapor pressure Not available

L. Solubility (ies) Not available

M. Vapor density Not available

N. Specific gravity 0.800 ± 0.006

O. Partition coefficient: n-octanol/water Not available

P. Auto ignition temperature Not available

Q. Decomposition temperature Not available

R. Viscosity Not available

S. Molecular weight Not available

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions:
- Contains gas under pressure; may explode if heated.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.
- Fire will produce irritating, corrosive and/or toxic gases.

B. Conditions to avoid:
- Heat, sparks or flames

C. Incompatible materials:
- Combustibles, reducing agents

D. Hazardous decomposition products:
- Corrosive and/or toxic fume
- Irritating and/or toxic gases
- Irritating, corrosive and/or toxic gases

11. Toxicological information

A. Information of Health Hazardous:

Acute toxicity

Oral [Category 5] (ATEmix = 3,582.13 mg/kg bw)

- **Dipropylene glycol methyl ether** : Rat LD_{50} > 5,000 mg/kg (OECD TG 401)
- **Surfactant mixture** : Rat LD_{50} = 2,500 mg/kg
- **Kerosine** : Rat LD_{50} = 3,488 mg/kg (female)

Dermal [Category 4] (ATEmix = 1,602.74 mg/kg bw)

- **Dipropylene glycol methyl ether** : Rat LD_{50} > 20 mg/kg (단위환산: 19,000 mg/kg) (OECD TG 402)
- **Surfactant mixture** : LD_{50} = mg/kg (negative)
- **Kerosine** : Rabbit LD_{50} = 1,500 mg/kg (female)

Inhalation [Not classified] (ATEmix = 373,333.33 mg/L)

- **Dipropylene glycol methyl ether** : Rat LC_{50} > 275 ppm/4hr (단위환산: 1.67 mg/L) (OECD TG 403)
- **Surfactant mixture** : Rat LD_{50} = mg/kg (negative)
- **Propane** : Rat LC_{50} = 280,000 mg/kg/10min

Skin corrosion/ irritation [Not available]

- **Dipropylene glycol methyl ether** : In test on skin irritation with rabbits, skin irritations were not observed. (OECD TG 404)
- **Surfactant mixture** : May cause burns to the skin.
- **Kerosine** : In skin irritation test with rabbits, moderate skin irritation was observed

Serious eye damage/ irritation [Not available]

- **Dipropylene glycol methyl ether** : Eyes irritations were not observed when exposed to human.
- **Surfactant mixture** : May cause burns to the eyes.
- **Kerosine** : In eye irritation test with rabbits, severe ocular effects were produced.(not fully reversible within 21 days)(OECD TG 405)

Respiratory sensitization [Not available]

Skin sensitization [Category 1]

- **Dipropylene glycol methyl ether** : Skin sensitization were not observed when exposed to human.
- **Kerosine** : In Local Lymph Node Assay using mice, no sensitising effects were observed.(OECD TG 429, GLP)

Carcinogenicity [Not classified]

KOREA-ISHL, IARC, NTP, OSHA, ACGIH, EU Regulation 1272/2008: not listed

Mutagenicity [Not classified]

- **Dipropylene glycol methyl ether** : Negative reactions were observed in vitro(Bacterial gene mutation test(OECD TG 471, GLP) , Chromosomal aberrations test(OECD TG 473, GLP)).
- **Kerosine** : Negative reactions were observed with and without metabolic activation in in vitro(Bacterial reverse mutation assay(OECD TG 471, GLP), sister chromatid exchange assay in mammalian cells(OECD TG 479, GLP), and in vivo(Mammalian erythrocyte micronucleus test(OECD TG 474)). But very weak positive effect was noted in in vitro mammalian cell gene mutation assay.(OECD TG 476, GLP)
- **Propane** : Negative reactions were observed with and without metabolic activation in vitro(mammalian chromosome aberration test(OECD TG 473, GLP), bacterial reverse mutation assay(OECD TG 471, GLP).

Reproductive toxicity [Not classified]

- **Dipropylene glycol methyl ether** : In reproductive toxicity study with rats, decreased body weights, decreased fertility, decreased ovary weights, increased incidence of histologic ovarian atrophy were observed. (OECD TG 416, GLP)
- **Kerosine** : In reproductive(OECD TG 422, GLP)/developmental(OECD TG 414, GLP) toxicity studies, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.
- **Propane** : In reproduction/developmental toxicity screening test, there were no significant adverse effects on reproductive parameters and no evidence of malformations at any doses.(NOAEC = 9000 ppm)(OECD TG 422, GLP)

Specific target organ toxicity (single exposure) [구분 3 (마취작용)] [null]

- **Dipropylene glycol methyl ether** : In acute inhalation toxicity with rats, adverse effects were not observed related to acute toxicity. (OECD TG 403)
- **Surfactant mixture** : Inhalation Irritating to airway.
- **Kerosine** : In acute dermal toxicity test with rabbits, erythema, edema, necrosis, salivation, unsteady gait and prostration were noted.
- **Propane** : In acute inhalation toxicity test with rats, acute toxic effects were not observed.

Specific target organ toxicity (repeat exposure) [Not classified]

- **Dipropylene glycol methyl ether** : In repeated oral toxicity study with rats for 13 weeks, no adverse effects were observed. (OECD TG 413, GLP)
- **Kerosine** : In repeated oral toxicity test with rats, increases in slight hepatocyte hypertrophy and decreases absolute thymus weights, increases relative kidney were observed. But significant histopathologic findings were not observed.(OECD TG 422, GLP)
- **Propane** : In repeated inhalation toxicity study with rats for 28 days, repeated toxicity related effects were not observed.(OECD TG 422, GLP)

Aspiration Hazard [Not available]

- **Surfactant mixture** : Inhalation of the edema and respiratory disease also may occur.

12. Ecological information

A. Ecological toxicity

- Acute toxicity : [Category 3] (ATEmix = 15.90910mg/ℓ)
- Chronic toxicity : [Category 3]

Fish

- **Dipropylene glycol methyl ether :** 96hr-LC_{50} (*Poecilia reticulata*) > 1000 mg/L (OECD TG 203, GLP)
- **Surfactant mixture :** 96hr-LC_{50} = 1.3 mg/L
- **Kerosine :** 96hr-LC_{50} = 200 mg/L (OECD TG 203)
- **Propane :** 96hr-LC_{50} = 27.98 mg/L (Estimated)

crustacean

- **Dipropylene glycol methyl ether :** 48hr-LC_{50} (*Daphnia magna*) = 1919 mg/L (OECD TG 202, GLP)
- **Surfactant mixture :** 48hr-LC_{50} = 4.8 mg/L
- **Kerosine :** 48hr-EC_{50} > 100 mg/L (OECD TG 202, GLP),7d-NOEC(Ceriodaphnia dubia) =19.63 mg/L (OECD TG 201, GLP)
- **Propane :** 48hr-LC_{50} = 14.22 mg/L (Estimated)

Algae

- **Dipropylene glycol methyl ether :** 96hr-EC_{50} (*Selenastrum capricornutum*) > 969 mg/L (OECD TG 201, GLP)
- **Surfactant mixture :** 96hr-LC_{50} = 9.5 mg/L Pseudokirchneriella, Subcapitata
- **Kerosine :** 96hr-EC_{50} > 100 mg/L , 96hr-NOEC(Scenedesmus subspicatus) ≥ 100 mg/L (OECD TG 201, GLP)
- **Propane :** 96hr-EC_{50} = 7.71 mg/L (Estimated)

B. Persistence and degradability

Persistence

- **Dipropylene glycol methyl ether** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 0.0043) (OECD TG 107, GLP)
- **Surfactant mixture** : High persistency (log Kow is more than 4 estimated.) (Log Kow = 4.48)
- **Kerosine** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 1.7)
- **Propane** : Low persistency (log Kow is less than 4 estimated.) (Log Kow = 2.8) (pH 7)(20 ℃)

Degradability

- **Kerosine** : Phototransformation(in air): DT50 = 9.5hr (estimated)(SRC AOP v1.92)

C. Bioaccumulative potential

Bioaccumulation

- **Dipropylene glycol methyl ether** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF < 100)
- **Surfactant mixture** : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 12.55)

Biodegradation

- **Dipropylene glycol methyl ether** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (= 96% biodegradation was observed after 28 days) (OECD TG 301F, GLP)
- **Kerosine** : As well-biodegraded, it is expected to have low accumulation potential in living organisms (90% ~ 100% biodegradation was observed after 15 days) (OECD TG 301 A, GLP)
- **Propane** : As not well-biodegraded, it is expected to have high accumulation potential in living organisms (= 50% biodegradation was observed after 2 days) (Q)SAR

D. Mobility in soil

- **Dipropylene glycol methyl ether** : Low potency of mobility to soil. (Koc = 1.377) (estimated)
- **Kerosine** : Low potency of mobility to soil. (Koc = 18.74) (estimated)(SRC PCKOCWIN v2.00)

E. Other hazardous effect Not available

13. Disposal considerations

A. Disposal method

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

B. Disposal precaution

Consider the required attentions in accordance with waste treatment management regulation.

14. Transport information

A. UN Number 1950
B. UN Proper shipping name AEROSOL
C. Transport Hazard class 2
D. Packing group Not applicable
E. Marine pollutant Not applicable
F. Special precautions
in case of fire F-D
in case of leakage S-U

15. Regulatory information

A. Occupational Safety and Health Regulation Not regulated
B. Toxic Chemical Control Act
Surfactant mixture : Existing Chemical Substance ; CAS No. 9016-45-9; KE-26244/ CAS No. 9005-65-6; KE-25511/ CAS No. 51811-79-1; KE-26248
Surfactant mixture : Restricted Chemicals CAS No. 9016-45-9; 06-5-6: ([Nonylphenols Nonylphenol ethoxylates] 0.1% or more in mixtures (prohibited from manufacturing importing or using for home cleaning solutions inks and paint))
Kerosine : Existing Chemical Substance (KE-19904)
C. Dangerous Material Safety Management Regulation
Dipropylene glycol methyl ether : Dangerous Material Safety Management Regulation
Kerosine : Dangerous Material Safety Management Regulation
D. Wastes Control Act Not regulated
E. Other regulation (internal and external)
Internal information
Persistant Organic Pollutants Acts Not regulated
External information
EU classification(classification)
Dipropylene glycol methyl ether : Classification Not classified
Kerosine : Classification Xn; R21, Xi; R41
Propane : Classification F+; R12
EU classification(risk phrases)
Dipropylene glycol methyl ether : Hazard statements Not applicable
Kerosine : Hazard statements R21, R41
Propane : Hazard statements R12
EU classification(safety phrases)
Dipropylene glycol methyl ether : Precautionary statements Not applicable
Kerosine : Precautionary statements S(2), S26, S36/37/39, S46
Propane : Precautionary statements S2, S9, S16
EU SVHC list Not regulated
EU Authorisation List Not regulated
EU Restriction list
Propane : EU Restriction list Regulated
U.S.A management information (OSHA Regulation) Not regulated
U.S.A management information (CERCLA Regulation) Not regulated
U.S.A management information (EPCRA 302 Regulation) Not regulated
U.S.A management information (EPCRA 304 Regulation) Not regulated
U.S.A management information (EPCRA 313 Regulation) Not regulated
Substance of Roterdame Protocol Not regulated
Substance of Stockholme Protocol Not regulated
Substance of Montreal Protocol Not regulated
Foreign Inventory Status
Dipropylene glycol methyl ether
U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): 7-97
China management information Inventory of Existing Chemical Substances (IECSC): Present
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present
New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval Code HSR001402
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present
Kerosine
U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (7)-97
China management information Inventory of Existing Chemical Substances (IECSC): Present 16453
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR005026
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

Propane

U.S.A management information Section 8(b) Inventory (TSCA): Present
Japan management information Existing and New Chemical Substances (ENCS): (2)-3
China management information Inventory of Existing Chemical Substances (IECSC): Present 03571
Canada management information Domestic Substances List (DSL): Present
Australia management information Inventory of Chemical Substances (AICS): Present
New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001010
Philippines management information Inventory of Chemicals and Chemical Substances (PICCS): Present

16. Other information

A. Information source and references

U.S. National library of Medicine(NLM) Hazardous Substances Data Bank(HSDB); http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
Emergency Response Guidebook 2008; http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf
Dongnamchem MSDS
U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB) ; http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm
National Emergency Management Agency-Korea dangerous material inventory management system; http://www.nema.go.kr/hazmat/main/main.jsp
Korea Occupational Health & Safety Agency; http://www.kosha.net
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; http://monographs.iarc.fr
OECD SIDS; http://webnet.oecd.org/hpv/ui/Search.aspx
The Chemical Database -The Department of Chemistry at the University of Akron; http://ull.chemistry.uakron.edu/erd/
National Chemicals Information System; http://ncis.nier.go.kr/ncis/
TOMES-LOLI®; http://www.rightanswerknowledge.com/loginRA.asp
Waste Control Act enforcement regulation attached [1]
The Chemical Database -The Department of Chemistry at the University of Akron; http://ull.chemistry.uakron.edu/erd/
EPISUITE : http://www.epa.gov/opt/exposure/pubs/episuitedl.htm
National Toxicology Program; http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm
American Conference of Governmental Industrial Hygienists TLVs and BEIs.
NIOSH Pocket Guide; http://www.cdc.gov/niosh/npg/npgdcas.html
REACH information on registered substances; http://apps.echa.europa.eu/registered/registered-sub.aspx#search
REACH information on registered substances; http://apps.echa.europa.eu/registered/registered-sub.aspx
EU CLP; http://esis.jrc.ec.europa.eu/index.php?PGM=cla
REACH informatThe Chemical Database -The Department of Chemistry at the University of Akron; http://ull.chemistry.uakron.edu/erd/ion on registered substances; http://apps.echa.europa.eu/registered/registered-sub.aspx
UN Recommendations on the transport of dangerous goods 17th
International Uniform Chemical Information Database(IUCLID); http://esis.jrc.ec.europa.eu/

B. Issuing date 2013.11.21

C. Revision number and date

revision number 1
date of the latest revision 2014.6.5.

D. Others

•Revised Material Safety Data Sheet based on the amendments made on the Ministry of Employment and Labor Public Notice on Standard for Classification Labeling of Chemical Substance and Material Safety Data Sheet.
•This MSDS is authored in pursuant to the Article 41 of the Occupational Safety and Health Act.
•The content is based on the latest information and knowledge that we currently possess.
•This MSDS was authored to aid buyer, processor or any other third person who handles the chemical of subject in the MSDS; additionally, it does not warrant suitability of the chemical for special purposes or the commercial use of statements that approves the use of it in combination with other chemicals as well as technical or legal liabilities.
•The content of the MSDS may vary depending on the country or the region and may not coincide with the actual regulations. Therefore, the buyer or the processor of the chemical is responsible for observing responsible government's or the region's regulations.